Story by Kathy Wythe

Pushing the reset button on Texas Rangelands

Recovering from drought requires patience, knowledge

Driving on Interstate-10 through West Texas past Sonora and on to Fort Stockton, travelers see patches of normally evergreen junipers turned brown and brittle from the unforgiving drought of 2011.

Dr. Charles "Butch" Taylor, superintendent of the Texas AgriLife Research Center in Sonora, said he has only seen juniper die two times in his 41 years at the center. "In 2000 and this past drought," he said. "I have never seen as much juniper brown out like I have seen this year."

Recovering this drought-damaged rangeland in West Texas and other parts of Texas will take patience and knowledge, according to experts.

Drought-ravaged rangelands

For one rangeland expert, the 2011 drought may have brought more damage than ever before.

Dr. Ron Sosebee, professor emeritus with Texas Tech University's Department of Natural Resources Management, predicted in an October 2011 *Drought in Texas* article that this drought on rangeland was "worse than it's ever been."

"I maintain that the drought of the 1950s impacted our rangeland vegetation enough that following the 1950s, the rangelands were never like they were prior to then," he said, "and I suggest that following this drought we won't be like we were prior to the time it occurred."

Will Hatler, Texas AgriLife Extension Service program specialist in the Department of Ecosystem Science and Management at Texas A&M University, said: "The degree to which rangelands were negatively impacted by this drought largely depends on how they were managed prior to and throughout the drought."

Throughout Texas, many ranchers sold or greatly reduced their livestock herds during 2011. According to some reports, more than 600,000 cattle were sold that year.

Hatler, based in Stephenville, said ranchers sold or reduced their livestock not only because of the lack of water but also because selling or reducing their herds helped protect their land.

"Failure to properly cull livestock herds during drought results in overgrazing and, consequently, significant plant death," Hatler said.

These rangeland experts are concerned most about the death of warm-season perennial grasses. Taylor said these grasses determine a major portion of the rangeland's carrying capacity, or the number of livestock a rancher can run on the range.

Based on his visual estimate, Taylor said the Sonora area probably lost 50 percent of these grasses from the 2011 drought. "It will take a while for that to recover," he said. "It won't happen overnight. It needs a couple of good years in a row of good growing season precipitation."

The drought not only possibly killed the grasses and other vegetation, but the record-breaking wildfire season, blamed partially on the drought, also potentially damaged the rangeland.

"Many thousands of acres of rangeland (in Texas) were burned by wildfire last year which, combined with overgrazing before and/or during the drought, could have a devastating effect on plant communities for years," Hatler said.

Dr. Alyson McDonald, AgriLife Extension range management program specialist in Texas A&M's Department of Ecosystem Science and Management, said some burned areas that received rain after the fires are recovering, but other burned areas that did not have rain are not improving.

"Landowners are concerned about what is coming back," she said. "And they are also concerned about soil loss. If they lose anymore top soil, there will be a major reduction in potential."

The loss of grasses and other vegetation from drought and wildfires can trigger serious erosion.

"The symptoms of developing erosion are sometimes subtle," Hatler said, "and the ability to recognize these symptoms is the first step in mitigation. Bare ground is the most obvious indicator, but other signs landowners should look for are pedestaled plants, small rills or gullies, litter dams and exposed plant roots."

Road to recovery

The rangeland experts advised land managers to be cautious and patient when working to recover their drought-ravaged rangelands.

"Rangeland managers are taught to keep in mind that the next drought is always around the corner and to plan accordingly during average rainfall years," Hatler said. "Proper grazing management prior to drought helps ensure that plant food reserves remain intact in dry years, minimizing loss of valuable forage."

Taylor recommended that ranchers conservatively restock their livestock. "They should match up the number of animals with the amount of forage they are producing," he said. "They need to be lightly stocked for at least two to three years following this drought to allow for the grasses to recover and come back into production."

Recovering drought-damaged rangeland throughout Texas will take patience and knowledge by rangeland managers. Photo courtesy of A.K. McDonald, Texas AgriLife Extension Service.

Hatler agreed.

"Aside from rainfall, resting drought-damaged rangelands is critical to the recovery process," he said. "Some areas of the state have received some decent rainfall over the winter, which initiated regrowth of grasses and forbs this spring. This may entice landowners into overestimating the health of the plant community and, in turn, encourage them to restock livestock herds.

"While spring green-up of forages will be a positive development, applying grazing pressure on recovering plants will only impede long-term recovery," he added. "Landowners should adopt a 'wait and see' attitude at this point."

Because warm-season perennial grasses took a large hit, McDonald said the biggest challenge will be determining how severely the drought and wildfires have impacted these grasses.

McDonald said wildfires often burn very quickly and burn spottily so there can be islands of unburned areas that provide a seed source and slowly expand to revegetate the burned areas. If the burned areas get summer rains, the grass that survived will green up rapidly.

"If that (the green up of the grasses) doesn't happen, then we'll begin to get a better picture (of their survival)," she said. "If it doesn't rain, we won't know."

Normally McDonald would not be that concerned about the fires' effect on the grasses, but last year some areas of West Texas, including Jeff Davis and Andrews counties, burned in April and did not receive the normal amount of rain in the summer.

"If we had gotten the rain in June, July and August, we would have been okay," McDonald said. "Wildfires do not create long-term damage as long as it rains in the next growing season. But we had gone a whole year without rain.

"Previous studies have shown if it rains immediately after burn, the response (of grasses) is quick," she said. "If it doesn't rain, it could take up to three years to recover."

Reseeding, while an option for recovery, is expensive and risky, McDonald said. At workshops throughout West Texas, she asks land managers to be patient and cautions them against widespread reseeding right now. "If we go another growing season without rain, there will need to be strategic reseeding, where it will have quickest and best response," she said.

Taylor said management plans are necessary to improve the health of these grasses.

"Ranchers need to monitor their rangeland and make sure the grasses are recovering," he said. "They need monitoring systems, for example photo-points, use ratings, plant reproduction and density estimates and trend analysis to quantify that the grasses are recovering."

"If recovering plants are not allowed to produce seed and reproduce vegetatively, natural recovery of the plant population as a whole will be impeded," Hatler said.

Numbers and palatability of toxic plants may increase during the drought, and ranchers should routinely inspect pastures and control these plants to avoid livestock injury, Hatler said.

He recommended deferring grazing in areas where erosion is found and avoid any mechanical brush control treatments, such as root plowing and chaining that disturb the soil.

McDonald said maintaining forage residue—or keeping some type of plant cover on the land—is an important tool for rangeland management, particularly during and after drought. Forage residue can anchor the top soil and prevent erosion by increasing water infiltration and reducing runoff. Managers should have some standing crops and some litter on the ground to provide protection for plant and soil surface, she added.

"I tell ranchers the best way to prepare for a drought is forage residue; the best way to recover from a drought is forage residue," she said. "If their rangeland is in better condition, recovery will begin much sooner than their neighbor who has no standing crop, little plant litter, lots of bare ground."

Fireproofing the land

Since having healthy rangeland before drought helps the land recover more quickly after drought, the experts said a beneficial management component before and after droughts is prescribed fires. This controlled application of fire to the naturally occurring build-up of underbrush can also lessen the impact of wildfires that might occur during drought, the experts said.

Dr. Roel Lopez, associate director of the Texas A&M Institute of Renewable Natural Resources, said that fire is a natural occurrence for rangelands, and grasses and other vegetation are well-adapted to fire. Fire keeps certain ecosystems in check. "Without that form of disturbance, grasslands would eventually turn into brushlands," he said.

Fire, followed by the necessary rain, also keeps grassland healthy and fertilizes the land by releasing nitrogen back into the soil.

"The benefits of fire have long been recognized," he said.

"Fire is to rangeland what rain is to a rainforest," Lopez said. "Historically and naturally, wildfires

were the mechanism to reset the succession of plant communities. Fire kills the wood vegetation and resets the succession process where new grasses can grow."

Lopez said prescribed fires can be used to 'fireproof' the landscape. "Prescribed fire minimizes the amount of fuel in the area that is likely to burn during wildfires," he said. "With prescribed fires, you can actually control what the end result might be. The use of prescribed fires is keeping that essential element in the system without the associated safety issues that come with naturally occurring wild fires."

Taylor agreed that prescribed fire is very necessary to part of the overall management strategy.

"It needs to be implemented on regular basis to maintain proper balance of grasses and forbs, increase biodiversity and improve habitat for domestic and wildlife," he said. "In fact, in my opinion, if they (land managers) do not use fire, they have the potential of the rangeland becoming dysfunctional."

Lopez said new grasses that grow after prescribed fires are beneficial for wildlife and livestock. "It's like having a fresh salad as compared to an old salad."

"Ranchers need to look at fire as a long-term management tool," Taylor said. "And they need to decide its goals and objectives and use fire to reach those goals and objectives."

Managing the recovery of rangelands is not easy, Taylor said, because managers not only have to integrate ecological and conservation principles but also have to consider the economics of restocking or not restocking. And because of finances, they have a tendency to want to restock quickly.

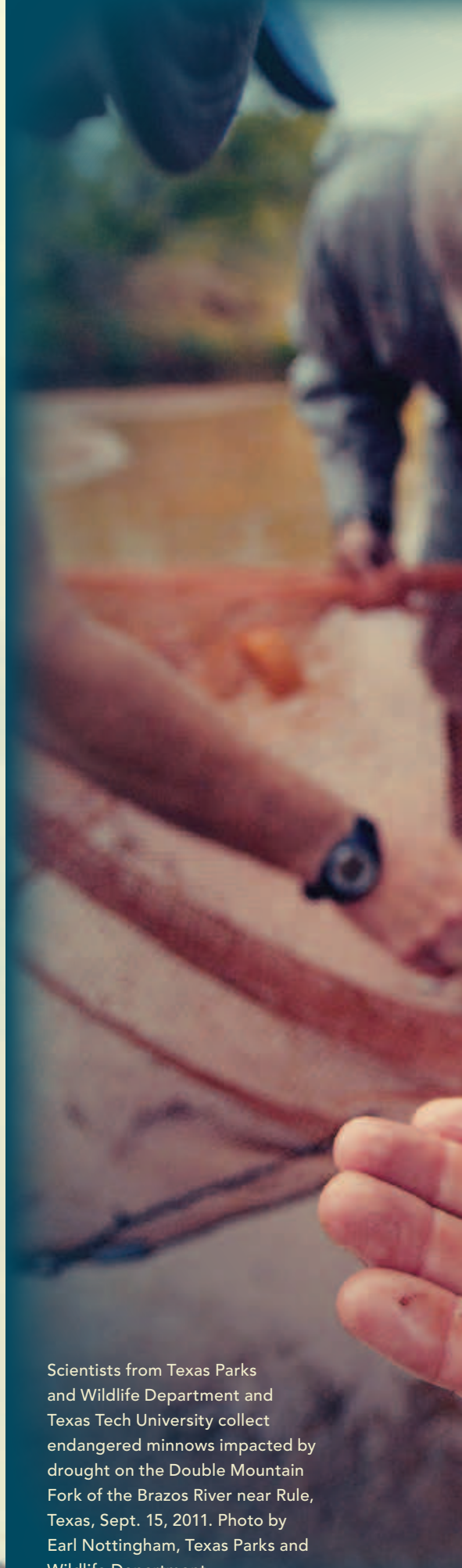
"If they make the wrong assumption and assume we are coming out of the drought and buy a lot of livestock and then we are still in the drought, they are going have to sell off livestock right back," he said. "That is not good for their financial situation but also not good for their landscape or their vegetation.

"We need to understand that drought is a natural occurrence in Texas and has been happening for tens of thousands of years," Taylor said. "Wet years are the exception."

As far as the brown junipers dotting the West Texas landscape, will those eventually turn green or are they dead? Both Taylor and McDonald said it is too early to tell.

"It may be that the plants are sacrificing their leaves as a water conservation strategy and will leaf out again when conditions are favorable," McDonald said. "They may survive."

For additional drought management information, visit *txH$_2$O* online at: *twri.tamu.edu/publications/txh2o/*.



Scientists from Texas Parks and Wildlife Department and Texas Tech University collect endangered minnows impacted by drought on the Double Mountain Fork of the Brazos River near Rule, Texas, Sept. 15, 2011. Photo by Earl Nottingham, Texas Parks and Wildlife Department.